

# ZooMontana Browse Book



January 2025

ZooMontana

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# ZooMontana Browse Policy



Browse is defined as any natural plant material that an animal is provided access to. This may be given for many reasons including bedding, shelter, enrichment, or as a part of their diet.

The goal of the ZooMontana browse program is to provide an assortment of safe plant materials to our animals, while at the same time striving to prevent exposing our animals to potentially hazardous plants. This is done by providing easy to access reference materials such as the “ZooMontana Browse Book” and having the Botanical Society of ZooMontana easily accessible to reference.

At ZooMontana most of the browse used is obtained from trees and plants growing on grounds. It is important that keepers become and stay familiar with the types of trees and plants that can be used as browse and the types that are toxic. The contents of the “ZooMontana Browse Book” provides information about the types of trees and plants that may be found on ZooMontana’s grounds. However, an “if you are unsure then don’t use it” policy should be followed.

Plants found on zoo grounds are included in the browse book once they are positively identified by the Botanical Society of ZooMontana. They are listed with pictures of the plant in varying seasonal conditions, with possible cautions that keepers need to be aware of, and the approximate location(s) of the plant that are known on zoo grounds.

When trimming trees and bushes on grounds for browse it is imperative that browse is taken in a way that is, non-harmful to the plant, does not affect the plants ability to continue to provide browse and does not affect the look of the plant from the publics eye. If you are not sure that this can be done, then do not trim the browse and ask someone like the Living Collections Curator about the best way to provide browse to your animals.

When providing new browse that an animal has not previously had, the zoo veterinarian must first approve the use of that browse for that animal. This helps to ensure that we are not giving an animal something that is potentially harmful.

From time to time browse may be donated for use at ZooMontana. When this is done, care must be taken to ensure that you know exactly what species of plant was donated, and that the donated browse has not been treated with anything. Many different plant species look alike, but may be toxic, and our animals should not come into contact with chemicals like pesticides.

The use of browse can be an amazing tool to enrich the lives of the animals under our care. When done properly and with care, we can ensure that the use of browse is done in a safe manner.

# Using plants for enrichment

*A statement from the American Association of Zookeepers enrichment notebook*

Most animals in the wild have an intimate relationship with the plants in their natural habitats. Plant material can be a food source, shelter, nesting material, locomotive avenue, visual or protective barrier, medicinal aid, scent marking tool, or vehicle for play. Many plants rely on and encourage animals to feed from them to distribute seeds and pollen. Some are protected from excessive browsing with adaptations, including thorns, bitter taste and toxic properties. Wild animals may have the benefit of parental instruction and/or spend their entire lives learning how to use plants found in their habitats.

Plants can be one of the most effective tools available to increase complexity in an otherwise “sterile” captive environment. Plants can soften the look of an enclosure, provide arboreal opportunities, provide shelter, food, visual barriers, olfactory stimulation, nesting materials and toys. For captive animals that do not have the benefit of parental or peer instruction, it is critical that animal caretakers recognize the benefits and risks associated with the use of different plants. Careful consideration of the types of plants placed within the reach of captive animals can minimize the risks while maximizing the many benefits plants can provide.

A plant may be listed both as toxic and as a browse plant depending on the stage of the plant’s life, the part of the plant used and the animals and their condition who are being exposed to it. To determine which list to place a plant on for your zoo, please seek the guidance of support staff from various departments in your zoo and always follow established protocols to minimize risks when implementing any enrichment.

# Alder

*Alnus Spp.*

All parts of the tree may be given as browse.

ZooMontana map locations: Z29



# Apple

*Malus spp.*

All parts of the tree may be given as browse. Fruit may be given as a part of the animals approved diet.

ZooMontana map locations: H18, H17



# Ash

Manchurian Ash - *Fraxinus mandshurica* White Ash - *Fraxinus Americana*

All parts of Ash trees may be used as browse.

ZooMontana map locations: Manchurian Ash - Z13

White Ash - A2, Z12



Manchurian Ash



White Ash

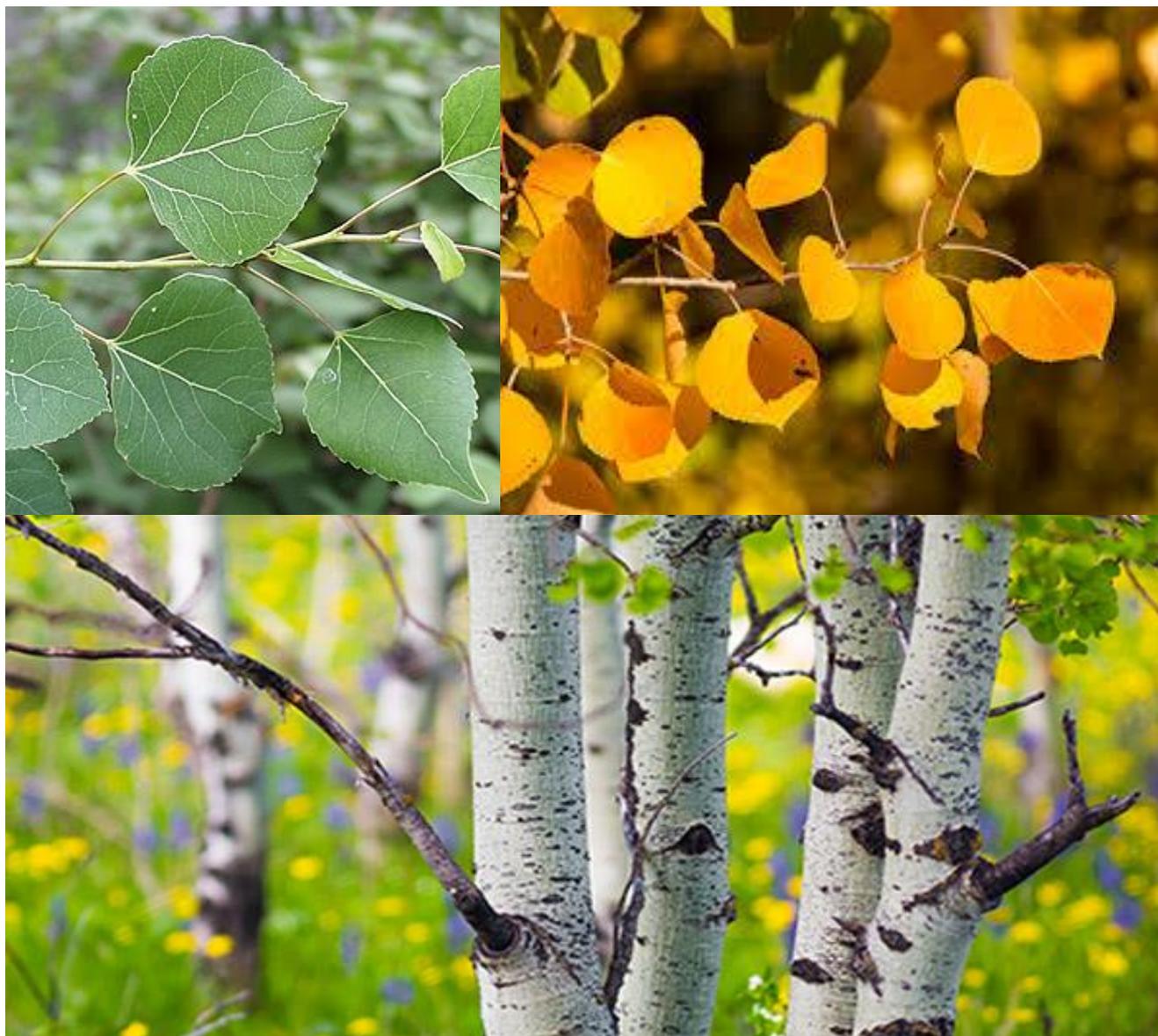


# Aspen

Quaking Aspen - *Populus tremuloïdes*

All parts of Aspen trees may be used as browse.

ZooMontana map locations: Z24, trees and saplings are confirmed to be all over grounds especially around otter, bird of prey, and bear.



# Bamboo

Bamboo is both ordered from commercial growers and grown on grounds in the bamboo garden that is west of wolf holding.



# Birch

Paper Birch - *Betula papyrifera*

All parts of birch trees may be used as browse.

ZooMontana map locations: Z40



# Boxelder

*Acer negundo*

Leaves are best to be used for browse.

ZooMontana map locations: Z3, Z23



# Catalpa

*Catalpa speciosa*

All parts of the catalpa tree may be used for browse.

ZooMontana map locations: H1



# Cottonwood

Plains Cottonwood – *Populus deltoïdes*

All parts can be used as browse, this is a favored browse species and is readily available all over the zoo.

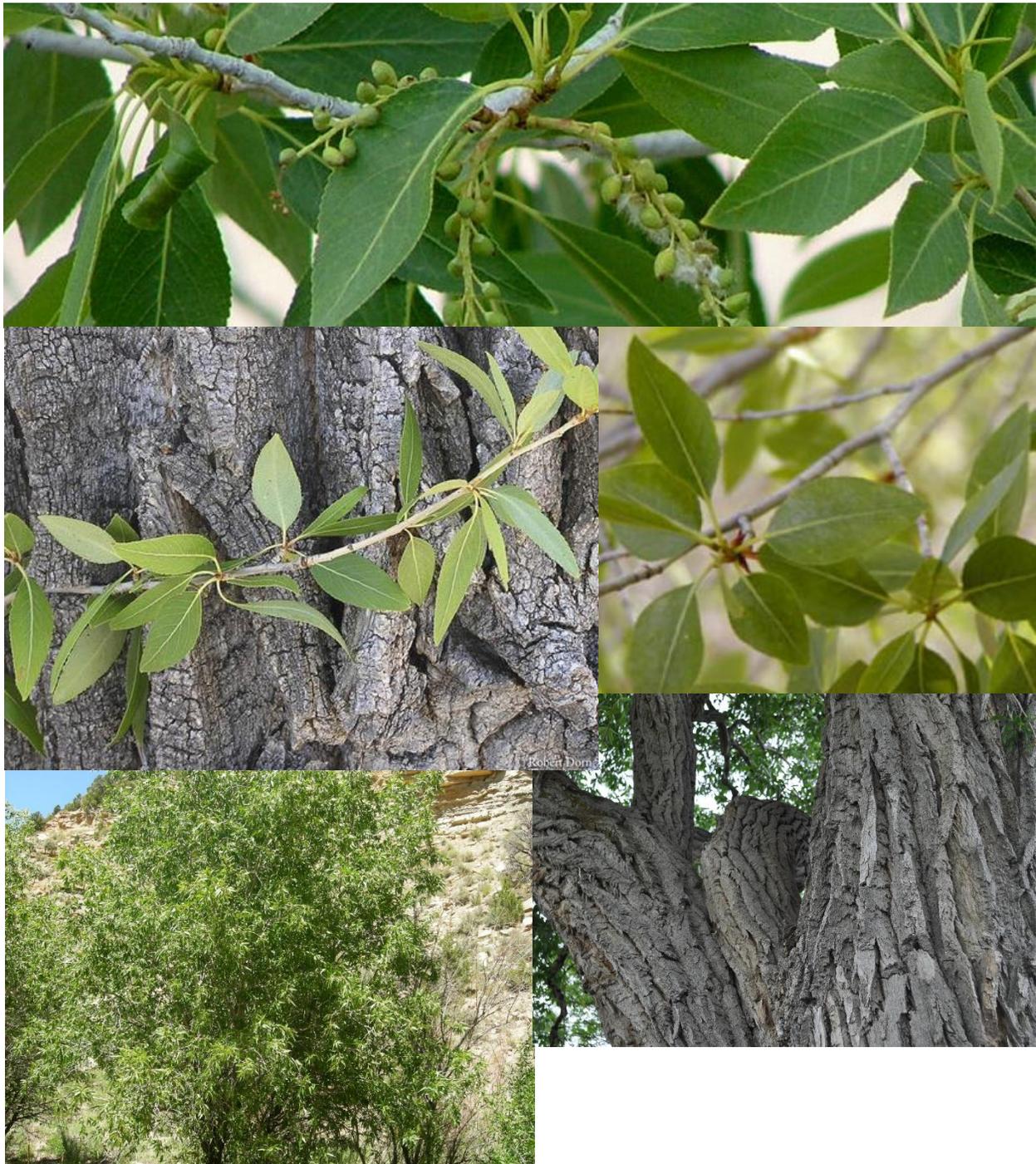


# Cottonwood

Narrow-leaved Cottonwood - *Populus angustifolia*

All parts of the tree can be used as browse.

ZooMontana map locations: Z39



# Crabapple

*Malus Spp.* – Same as apple trees

All parts of the tree may be given as browse.

ZooMontana map locations:

H3, Z38, SG15

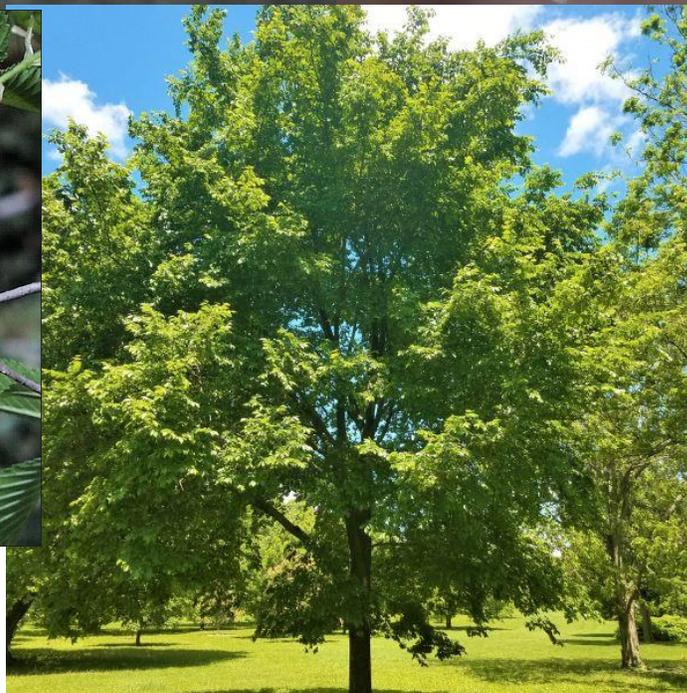


# Elm

American Elm - *Ulmus Americana*

All parts may be used as browse.

This is a favored browse species.



# Hackberry

*Celtis occidentalis*

Leaves and stems make good browse.

ZooMontana map locations: CG7



# Harry Lauder's Walking Stick

*Corylus avellana* 'Contorta' aka: Corkscrew Hazel

All parts may be used as browse

ZooMontana map locations: SG18



# Hawthorn

Black Hawthorn - *Crataegus douglasii*

All parts may be used as browse

ZooMontana map locations: Z33



# Hawthorn

Cockspur Hawthorn – *Crataegus crus-galli*

All parts may be used as browse

ZooMontana map locations: DG2

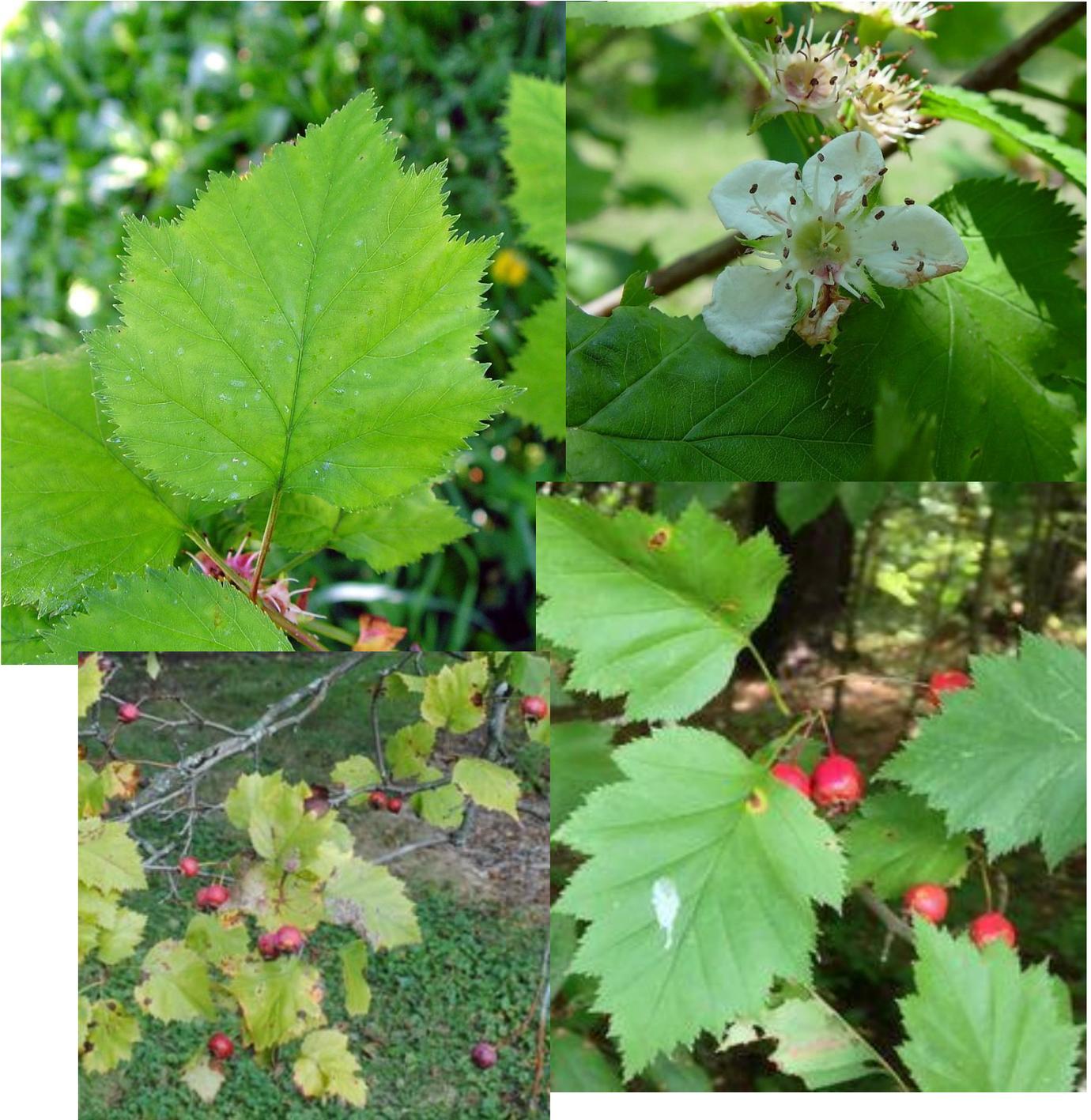


# Hawthorn

Kansas Hawthorn – *Crataegus coccinioides*

All parts may be used as browse

ZooMontana map locations: DG2



# Hawthorn

Russian Hawthorn – *Crataegus ambigua*

All parts may be used as browse

ZooMontana map locations: H10



# Honeysuckle

*Lonicera spp.*

Leaves and vines may be given as browse. Berries of certain varieties are toxic so no berries should be given.



# Juniper

*Juniperus* spp.

Juniper is browse that can be used for enrichment, shelter making, and as a novel item. There are several varieties around the zoo.

ZooMontana map locations: SG16, CG1, Z21, DG5 (moonglow juniper). A4 (Wichita Blue Juniper), SG2&SG8 (Rocky Mountain Juniper). SG11&SG19 (Weeping Juniper).



# Linden

*Tilia Americana*

All parts can be used as browse.

ZooMontana map locations: Z10, PL2, Z5



# Locust

## Honey Locust – *Gleditsia triacanthos*

Honey locust is a favored browse, all parts of the tree can be used. Black locust is toxic so care should be taken to ensure you are giving honey locust.

ZooMontana map locations: A1, SG5, H5, Z1



# Honey Locust Vs Black Locust

Both species can be found on the zoo. Honey locust is a favored browse species for a lot of animals, **black locust is toxic**. They look similar but there are some distinct differences.



## BROADLEAF TREE IDENTIFICATION



FABACEAE - PEA FAMILY  
**ROBINIA PSEUDOACACIA**  
 BLACK LOCUST  
 LEAF TYPE: ALTERNATE,  
 UNTOOTHED, PINNATE

FABACEAE - PEA FAMILY  
**GLEDITSIA TRICANTHOS**  
 HONEY LOCUST  
 LEAF TYPE: ALTERNATE,  
 TOOTHED, BIPINNATE



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Black locust leaves are larger and have smooth edges. Honey locust leaves are smaller and have toothed edges.

Honey locust leaves follow the same pattern but there is an additional branch between leaf rows that are coming off the main stem.

# Maple

*Acer spp.*

ZooMontana has a lot of different maple tree species on zoo grounds. Maples are a good choice for browse with an exception. **Red maple (*Acer rubrum*) is thought to possibly be toxic to horses.** This may include species that are a hybridized with *A. rubrum*. Species found at ZooMontana include Jeffersred maple (*A. rubrum* x *A. saccharinum*), Big Tooth Maple (*Acer grandidentatum*), Norway Maple (*Acer platanoides*), Pacific Sunset Maple (*A. truncatum* x *A. platanoides*), Paperbark Maple (*Acer griseum*), Silver maple (*Acer Saccharium*), Tartarian Maple (*Acer tataricum*), and Amer Maple (*Acer ginnala*)

Jeffersred maple (*A. rubrum* x *A. saccharinum*) –



Big Tooth Maple (*Acer grandidentatum*) -



Norway Maple (*Acer platanoides*) -



Pacific Sunset Maple (*A. truncatum* x *A. platanoides*) -



*Paperbark Maple (Acer griseum) -*



*Silver maple (Acer Saccharium) -* Also known as sugar maple. Great browse choice!



Tartarian Maple (*Acer tataricum*) -



Amer Maple (*Acer ginnala*) -



# Pine

Pine boughs are a great choice to use for enrichment, such as shelter building, scent enrichment, and to beautify a habitat. Animals may enjoy rubbing against pine trees. Note that pine needles are thought to clog filters and pumps of water features. ZooMontana has a few different species of pine trees on zoo grounds.

## Austrian Pine (*Pinus nigra*)-



Bristlecone pine (*Pinus longaeva*) -



Mugo Pine (*Pinus mugo*) -



Ponderosa Pine (*Pinus ponderosa*) -



White Pine (*Pinus strobus*) -



# Russian Olive

*Elaeagnus angustifolia*

All parts may be used as browse. Can be found around the zoo, especially along Canyon Creek by the eagle bridge. This is a non-native invasive species of plant.



# Sea Buckthorn

*Hippophae rhamnoides*

All parts can be used as browse. **Be cautious of thorns.**

ZooMontana map locations: A5



# Spruce

Spruce boughs are a great choice to use for enrichment, such as shelter building, scent enrichment, and to beautify a habitat. Animals may enjoy rubbing against spruce trees. Note that spruce needles are thought to clog filters and pumps of water features. ZooMontana has a few different species of spruce trees on zoo grounds.

## Colorado Blue Spruce (*Picea pungens*) -



Alberta Spruce (*Picea glauca*) -



Norway Spruce (*Picea abies*) -



Serbian Spruce (*Picea omorika*)-



# Walnut

Black Walnut - *Juglans nigra*

Branches leaves and nuts are good browse choices.

ZooMontana map locations: Z41



# Willow

*Salix spp.*

Willow is an excellent choice for browse. All parts of the tree may be used.

ZooMontana map locations:

Corkscrew willow H14. Peachleaf Willow Z19

Corkscrew Willow (*Salix matsudana*) -



Peachleaf Willow (*Salix amygdaloides*)-



# Yellowhorn

This tree is is protected status

*Xanthoceras sorbifolia*

Leaves and branches are a good browse option.

ZooMontana map locations: SGI



**TOXIC**

# Cherry

*Prunus spp.*

Cherry leaves and branches are toxic and should not be used as browse. There are several species of cherry tree on the zoo grounds including European Bird Cherry, Pie Cherry, and Sour Cherry.



ZooMontana map  
locations: Z6, H21,  
Z42



# **TOXIC** Chokecherry

*Prunus spp.*

Chokecherry leaves and branches are toxic and should not be used as browse.



ZooMontana map  
locations: PL3, Z37,  
SG9, SG17



# Kentucky Coffee Tree

**TOXIC**

*Gymnocladus dioica*



ZooMontana map  
locations: H12, H11, Z17



# Black Locust

**TOXIC**

*Robinia pseudoacacia*

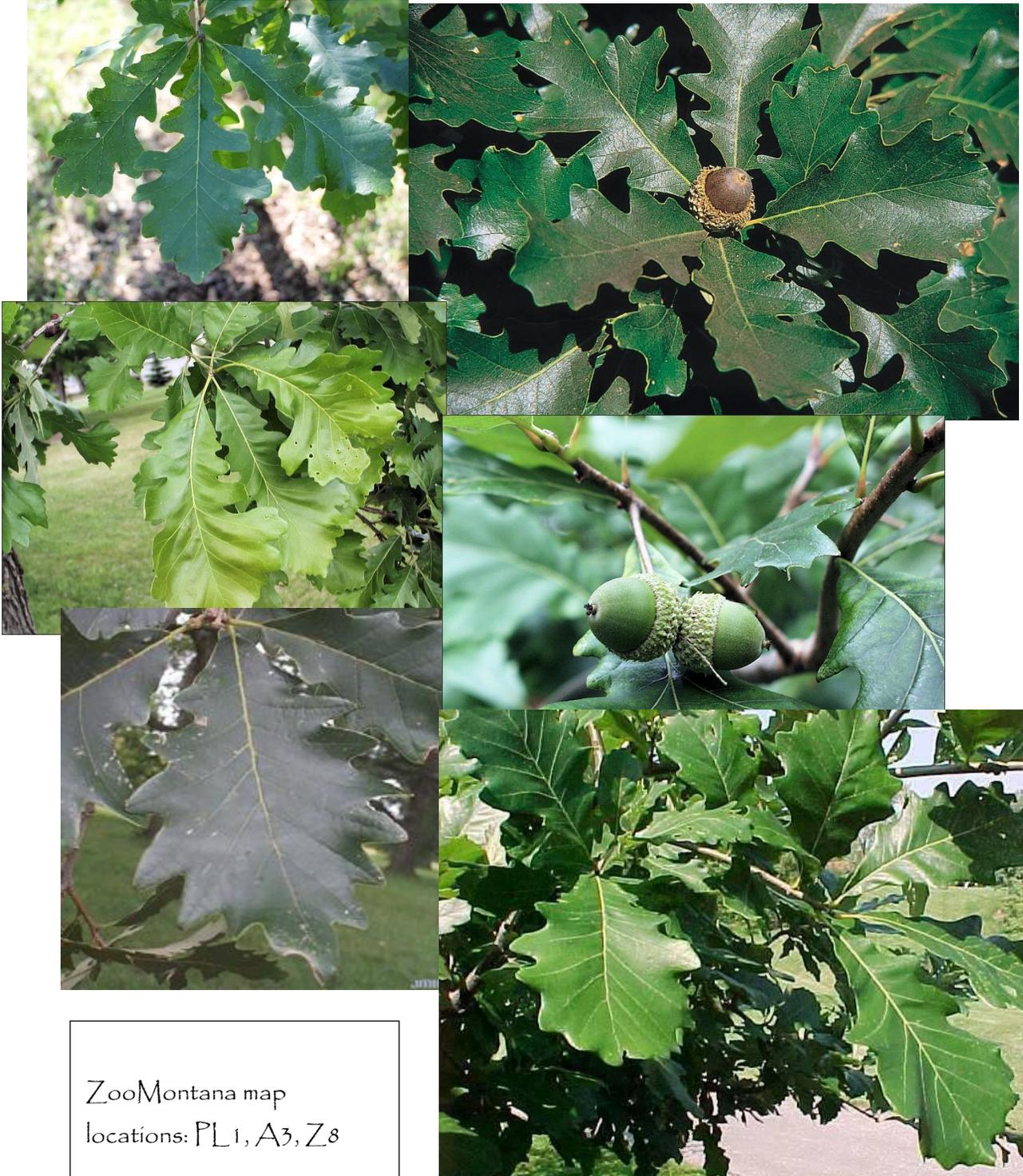


ZooMontana map  
locations: Z16

# Oak

*Quercus spp.*

**TOXIC**



ZooMontana map  
locations: PL1, A3, Z8

**TOXIC**

# Plum

*Prunus spp*



ZooMontana map locations:  
H19, H20

# Serviceberry

**TOXIC**

ZooMontana map locations:  
SG14, Z28



**TOXIC**

# Sumac

Stag Horn Sumac - *Rhus typhina*



ZooMontana map locations:  
Z35. Also grows around Bird of  
Prey.



# ZOOMONTANA Tree MAPS

Provided by Yellowstone Arboretum

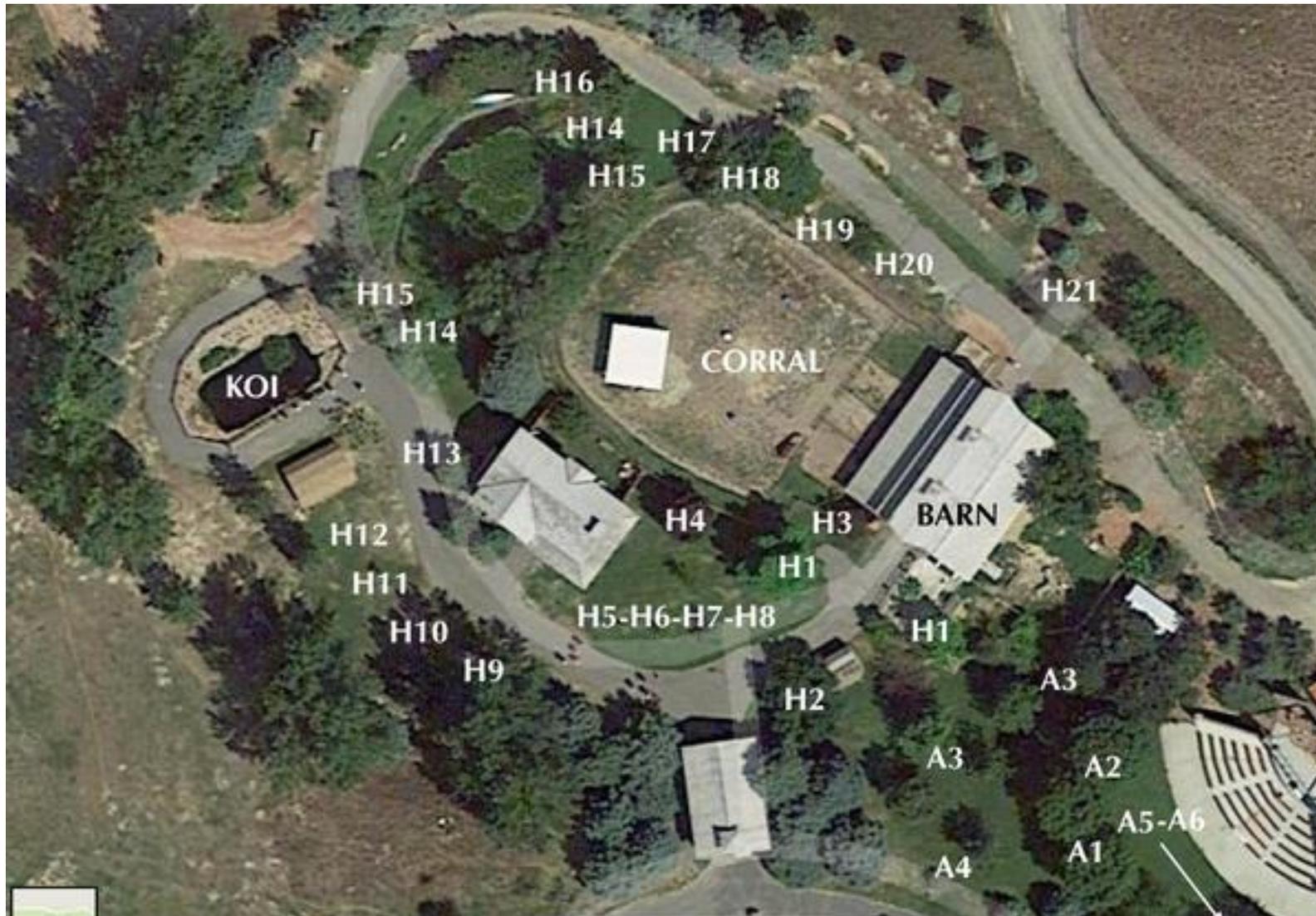
Note: Location and variety of trees is subject to change



SG1: Yellow Horn  
 SG2: Rocky Mountain Juniper  
 SG3: Lilac Tree  
 SG4: Bristlecone Pine  
 SG5: Honey Locust  
 SG6: Prairie Gem Pear  
 SG7: Mountain Ash  
 SG8: Rocky Mountain Juniper  
 SG9: Chokecherry "Shubert"  
 SG10: Smoke Tree  
 SG11: Tolleson's Weeping  
 SG12: Mugo Pine  
 SG13: Amer Maple "Flame"

SG14: Saskatoon Serviceberry  
 SG15: Red Jade Crabapple  
 SG16: Juniper  
 SG17: Amur Chokecherry  
 SG18: Harry Lauder's Walking Stick  
 SG19: Tolleson's Green Weeping  
 SG20: Dwarf Alberta Spruce

Keeper notes:



H1: Catalpa  
 H2: Norway maple  
 H3: Crabapple  
 H4: Maple "Memorial Tree"  
 H5: Honey Locust  
 H6: Hawthorn  
 H7: Cottonwood  
 H8: Unknown (to be identified)  
 H9: Kansas Hawthorn  
 H10: Russian Hawthorn

H11: Kentucky Coffee Tree  
 H12: Kentucky Coffee Tree  
 H13: Colorado Spruce  
 H14: Corkscrew Willow  
 H15: Tamarac Larch (and sapling)  
 H16: Silver Maple  
 H17: Unknown Apple  
 H18: Unknown Apple  
 H19: Unknown Plum  
 H20: Unknown Plum

H21: Pie Cherry  
 A1: Honey Locust  
 A2: White Ash  
 A3: Burr Oak  
 A4: Juniper "Witchita Blue"  
 A5: Sea Buckthorn  
 A6: Japanese Tree Lilac

*Keeper notes:*



CG1: Juniper  
 CG2: Skyline Locust  
 CG3: Plains Cottonwood  
 CG4: Norway Spruce  
 CG5: Big Tooth Maple  
 CG6: Paperback Maple  
 CG7: Hackberry

*Keeper notes:*



- PL1: Burr Oak
- PL2: Linden
- PL3: Chokecherry
- PL4: American Elm

Keeper notes:



- Z1: Honey Locust
- Z2: Silver Maple
- Z3: Sensation Boxelder
- Z5: Linden (memorial)
- Z6: European Bird Cherry
- Z7: Autumn Blaze maple "Jeffersred"
- Z8: Swamp White Oak
- Z9: Pacific Sunset Maple
- Z10: Linden
- Z11: Plains Cottonwood
- Z12: White Ash
- Z13: Manchurian Ash
- Z14: Autumn Blaze Pear
- Z15: Ponderosa Pine
- Z16: Black Locust
- Z17: Kentucky Coffee Tree
- Z18: Serbian Spruce

(Z17 & Z18 both located south of Z15)

Keeper notes:



Z19: Peach Leaf Willow  
 Z20: Unknown Ash  
 Z21: Juniper  
 Z22: Austrian Pine Grove  
 Z23: Sensation Boxelder

**COTTONWOOD GROVES:**  
 The majority of trees within the multiple groves are "Plains Cottonwoods".

Keeper notes:



Z18: Serbian Spruce  
 Z24: Quaking Aspen  
 Z25: Colorado Spruce  
 Z26: Ponderosa pine  
 Z27: Mugo Pine  
 Z28: Serviceberry tree  
 Z29: Common Alder  
 Z30: Ornamental Pine  
 Z31: White Pine  
 Z32: Hybrid Maple  
 Z33: Black Hawthorn

*Keeper notes:*



Z33: Black Hawthorn continued  
 Z34: Tamarac Larch  
 Z35: Stag Horn Sumac  
 Z36: Maple Shrub  
 Z37: Chokecherry "Canada Red"

#### COTTONWOOD & MIXED GROVE:

(Wolves Exhibit) In this area can also be found mixed native trees and woody shrubs.

*Keeper notes:*



Z18: Serbian Spruce  
 Z38: Crabapple  
 Z39: Narrow-leaf Cottonwood

"Millennium Grove" is a part of the garden exhibits at ZooMontana. It consists of Serbian Spruce.

Keeper notes:



- Z39: Narrow-leaf Cottonwood
- Z40: Paper Birch
- Z41: Black Walnut
- Z42: Sour Cherry Tree

*Keeper notes:*

# Cutting Browse

When trimming trees and bushes on grounds for browse it is imperative that browse is taken in a way that is, non-harmful to the plant, does not affect the plants ability to continue to provide browse and does not affect the look of the plant from the public's eye. If you are not sure that this can be done, then do not trim the browse and ask someone like the Living Collections Curator about the best way to provide browse to your animals.

Branches should be cut as close to the tree or larger branch as possible. Care should be taken to not leave stumps and snags from branches not cut properly.



## Sources:

American Association of Zookeepers (AAZK) Enrichment Notebook 2<sup>nd</sup> edition and 4<sup>th</sup> edition.

<https://www.aazk.org/wp-content/uploads/North-Carolina-Zoo-Browse-Program.pdf>

<https://nagonline.net/tag/browse/>